



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/457,013

12/08/1999

MARK E HOLZBACH

M-8620 US

7201

33031

7590

09/27/2002

CAMPBELL STEPHENSON ASCOLESE, LLP
4807 SPICEWOOD SPRINGS RD.
BLDG. 4, SUITE 201
AUSTIN, TX 78759

EXAMINER

AMARI, ALESSANDRO V

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 09/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/457,013

Applicant(s)

HOLZBACH, MARK E

Examiner

Alessandro V. Amari

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 3, 9, 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Woodgate et al. (U.S. Patent 6,008,484).

Regarding claim 1, Woodgate et al. discloses an apparatus for displaying a three-dimensional image, comprising a plurality of lenslet pixel modules with each module defined in part by a respective lenslet (3, Figure 20), each lenslet pixel module corresponding with and operable to produce a complete 3D pixel of the three-dimensional image (see Figure 20-, column 1, lines 51-55)-, a plurality of two-dimensional moving image sources associated with and forming a portion of the lenslet pixel modules (2, Pixels, Figure 20-1 each pixel can be considered a separate two-dimensional 'image source), and the lenslet pixel cooperating with each other to

Art Unit: 2872

form a projector array for displaying the three dimensional image (column 12, lines 4-19).

Regarding claim 3, Woodgate et al. discloses at least one lenslet pixel module having a partially silvered mirror and a sensor disposed adjacent thereto (see Figures 21 and 22).

Regarding claim 9, Woodgate et al. discloses that the plurality of lenslet pixel modules disposed in an array relative to each other (see Figure 20); at least two of the lenslet pixels modules having a respective sensor disposed therein (40, Figure 20)-I and the sensors cooperating with each other to form a sensor array for sensing at least one real three-dimensional object (column 12, lines 4-19).

Regarding claims 14 and 15, Woodgate discloses that the plurality of lenslet pixel modules disposed in an array relative to each other (see Figure 20); a plurality of sensors interspersed within the array of lenslet pixel modules (40, Figure 20); the sensors cooperating with each other to form a sensor array having a first focal plane (column 12, lines 4-19)-I and the lenslet pixel modules cooperating with each other to form a projector array having a second focal plane (column 1, lines 51-55); wherein the focal plane of the sensor array corresponding generally with the focal plane of the projector array (both the focal plane of the sensor array and the focal plane of the projector array have to be where the observer is, so that the eyes of the observer can be tracked and so the observer can see the image).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 4-7, 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Official Notice.

Regarding claim 2, Woodgate et al. discloses the claimed invention as described above except for a fly's eye lens sheet having a plurality of fly's eye lenslets disposed thereon to provide the respective lenslet for each lenslet pixel module. Official Notice is taken that the use of fly's eye lens sheets having a plurality of fly's eye lenslets disposed thereon to provide the respective lenslet for a lenslet pixel module is well known in the art. It would have been obvious to one of ordinary skill at the time the invention was made to have a fly's eye lens sheet having a plurality of fly's eye lenslets disposed thereon to provide the respective lenslet for each lenslet pixel module of Woodgate et al. in order to allow the 3D image to be seen at more viewing angles.

Regarding claims 4 and 11, Woodgate discloses a two-dimensional image source that is a liquid crystal display and is associated with and forms a portion of at least one lenslet pixel module (2, Figure 20 and column 1, lines 51-55). Woodgate et al. does not disclose the liquid crystal display as being a high-resolution display. Official Notice is taken that the use of liquid crystal displays that are high resolution displays is well known in the art. It would have been obvious to one of ordinary skill in the art at the

Art Unit: 2872

time the invention was made to have the liquid crystal Woodgate et al. be a high resolution display in order to improve the quality of the three-dimensional image.

Regarding claim 5, the combination discloses that the sensor array has a first focal plane that the focal plane of the sensor array corresponds generally with a focal plane of the projector array (see Figure 14; both the focal plane of the sensor array and the focal plane of the projector array have to be where the observer is, so that the eyes of the observer can be tracked and so the observer can see the image).

Regarding claim 6, the combination discloses the claimed combination as described above except for the at least one sensor comprising a video sensor. Official Notice is taken that the use of sensors that are video sensors is well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made at least one sensor comprise a video sensor in order to be able to sense a moving image.

Regarding claim 7, the combination discloses the claimed invention as described above except for the sensor being a charged coupled device. Woodgate et al. discloses that the use of charged coupled devices are well known. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the sensor of the combination be a charged coupled device in order to cut production costs.

Regarding claim 12, Woodgate et al. discloses that the plurality of lenslet pixel modules are disposed in an array relative to each other (see Figure 20-1 Woodgate) and that a two-dimensional image source is associated with each respective lenslet pixel module (2, Figure 20). Woodgate et al. does not disclose the two-dimensional image sources as

being high-resolution two-dimensional image sources. Official Notice is taken that the use of high-resolution two-dimensional image sources is well known. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the two-dimensional image sources of Woodgate et al. be high resolution two-dimensional image sources in order to improve the quality of the three dimensional image.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Official Notice as applied to claims 2, 4-7, 11, and 12 above, and further in view of lwata et al. (U.S. Patent 5,982,342).

Regarding claim 13, Woodgate et al. in view of Official Notice discloses the claimed invention except for having one two-dimensional image source be associated with two or more lenslet pixel modules and each of the lenslet pixel modules being associated with a dedicated region of the respective two-dimensional image source. lwata et al. discloses a two-dimensional image source associated with two or more lenslet pixel modules (70-11, 86-11, 88-11, Figure 11), and each of the lenslet pixel modules is associated with a dedicated region of the respective two-dimensional image source (see Figures 11 and 12 and column 10, lines 31-59). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have one two-dimensional image source of Woodgate et al. in view of Official Notice be associated with two or more lenslet pixel modules and each of the lenslet pixel modules of Woodgate et al. in view of Official Notice be associated with a dedicated region of the respective two-dimensional image source as lwata et al. suggests in order to reduce the

Art Unit: 2872

number of two-dimensional image sources needed to create the three-dimensional image and thus reduce production costs.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Iwata et al.

Regarding claim 8, Woodgate et al. discloses the claimed invention except for the three-dimensional image being full parallax. Iwata et al. discloses that a three dimensional image that is full parallax (see Figure 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the three dimensional image of Woodgate et al. be full parallax as Iwata et al. in order to make the 3D image visible from necessary observational positions (column 2, lines 19-20-, Iwata et al.).

7. Claims 10, 16-18, 22, 23, 25-27, 29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Burger (U.S. Patent 5,973,844).

Regarding claim 16, Woodgate et al. discloses the claimed invention above except for the focal plane of the sensor array having an orientation different from the focal plane of the projector array. Burger discloses a focal plane of a sensor array having an orientation different from a focal plane of a projector array (see Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the focal plane of the sensor array of Woodgate et al. have an orientation different from a focal plane of the projector array as Burger suggests in order to track an object other than an observer's eyes.

Regarding claims 17, 18, and 29, Woodgate et al. discloses a system for presenting a scalable autostereoscopic image comprising a plurality of lenslet pixel modules with each module defined in part by a respective lenslet (3, 2, Figure 20), each lenslet pixel module corresponding with and operable to produce a complete 3D pixel of the autostereoscopic image (column 1, lines 51-55); and a plurality of two-dimensional image sources associated with and forming a portion of each lenslet pixel module (2, Figure 20-, each pixel can be considered a separate two-dimensional image source). Woodgate et al. does not disclose at least one computer processing unit providing an input to the two-dimensional high resolution image sources or the input supplied to the two-dimensional image sources comprising digital data corresponding to a two-dimensional image or lenslet being fly's eye lenslet. Burger discloses at least one computer processing unit providing an input to two-dimensional high resolution image sources and input supplied to the two-dimensional image sources comprising digital data corresponding to a two dimensional image (556, Figure 25 and column 34, lines 28-29 and 33-35) and a lenslet that is a fly's eye lenslet (532, Figure 24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have at least one computer processing unit provide digital input to the two-dimensional high resolution image sources of Woodgate et al. and to have the lenslet of Woodgate et al. be a fly's eye lenslet as Burger suggests in order to be able to easily obtain a desired image and to be able to easily change the image on the display and to see the image in more than one viewing position.

Regarding claims 22 and 32, the combination discloses a plurality of sensors with each sensor disposed within one of the lenslet pixel modules (40, Figure 25). The combination does not disclose each sensor being coupled with the computer processing unit to provide information to the computer processing unit concerning a real object in front of the lenslet pixel modules. Burger discloses sensors that are coupled with a computer processing unit to provide information to the computer processing unit concerning a real object in front of lenslet pixel modules (582, 584, Figure 27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have each of the sensors of the combination be coupled with the computer processing unit to provide information to the computer processing unit concerning a real object in front of the lenslet pixel modules as Burger Suggests in order to able to create an active display (column 16, lines 11-12-, Burger).

Regarding claim 10, the combination discloses the sensor array provides information to the projector array to allow interaction between the at least one real three-dimensional image and the three-dimensional image (column 12, lines 4-19-1 Woodgate et al.).

Regarding claim 23, the combination discloses that the lenslet comprise a plurality of lens selected from the group consisting of cylindrical, convex, concave, gradient index, diffractive, refractive, holographic optical elements and other prisms which form an autostereoscopic image (3, Figure 20-1 Woodgate et al.).

The method recited in claims 25-27 are inherent in the apparatus described above.

Art Unit: 2872

8. Claims 20, 28, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Burger as applied to claims 10, 16-18, 22, 23, 25-27, 29, and 32 above, and further in view of Iwata et al.

Regarding claim 20 and 31, Woodgate et al. in view of Burger discloses the claimed invention as described above except for the autostereoscopic image being full parallax. Iwata discloses an autostereoscopic image that is full parallax (see Figure 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the autostereoscopic image of Woodgate et al. in view of Burger be full parallax as Iwata et al. in order to make the 3D image visible from necessary observational positions (column 2, lines 19-20, Iwata et al.).

The method recited in claim 28 is inherent in the apparatus described above.

9. Claims 19, 21, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Burger as applied to claims 10, 16-18, 22, 23, 25-27, 29, and 32 above, and further in view of Ashihara et al. (U.S. Patent 5,883,739).

Regarding claims 19, 21, and 30, the combination discloses the claimed invention except for a plurality of first computer processing units having at least one video output channel to supply video images to the two-dimensional image sources, two-dimensional image source coupled with one of the first computer processing units, and a master computer processing unit coupled with and supplying data to the first computer processing units. Burger discloses a plurality of first processing units (558a-558d, Figure 25); two-dimensional image source coupled with one of the first

Art Unit: 2872

processing units (554, Figure 25)-, and a master processing unit coupled with and supplying data to the first processing units (556, Figure 25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the system of the combination a plurality of first processing units, two dimensional image source coupled with one of the first processing units, and a master processing unit coupled with and supplying data to the first processing units as Burger suggests in order to be able to adapt the system to any number of applications. The combination does not disclose the first processing unit having at least one video output channel to supply video images to the two-dimensional image sources. Ashihara et al. discloses a first processing unit that has at least video output channel to supply video images to a two-dimensional image source (7, Figure 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first processing units of the combination have at least one video output channel to supply video images to the two-dimensional display as Ashihara et al. suggests in order to supply a viewer with needed or entertaining images.

10. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodgate et al. in view of Burger as applied to claims 10, 16-18, 22, 23, 25-27, 29, and 32 above, and further in view of Official Notice.

Regarding claim 24, the combination discloses the claimed invention as described above except for a portion of the sensors providing high resolution information about the real object and a portion of the sensors providing low resolution information about the real object. Burger et al. discloses a portion of a plurality of

Art Unit: 2872

sensors provide high resolution information about a real object (column 12, line 45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a portion of the sensors of the combination provide high resolution information about the real object in order to improve the quality of the image formed from that data. Official Notice is taken that having a portion of a plurality of sensors, provide low resolution information about a real object is well known. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a portion of the sensors of the combination provide low resolution information about the real object in order to cut production costs.

Response to Arguments

11. Applicant's arguments filed 05 July 2002 have been fully considered but they are not persuasive.

The applicant argues that Woodgate et al. neither teaches nor suggests an apparatus for displaying a three-dimensional image specifically, wherein each lenslet pixel module is operable to produce a complete 3D pixel as the applicant in the specification uses the term.

In response to this argument, the applicant is directed to the Woodgate et al., abstract, column 1, lines 6-8 and column 11, lines 58-60 which clearly state that the apparatus is an autostereoscopic 3D display. In regard to the term "3D pixel", the specification defines the term as the smallest part of an electronically coded 3D graphic or 3D picture image or to the smallest addressable element in an electronic display. However, the term "complete 3D pixel" is not defined. Figure 20 of Woodgate et al.

Art Unit: 2872

clearly shows a lenslet pixel module (3) corresponding with and operable to produce a complete 3D pixel of the three dimensional image. Furthermore, Woodgate et al. in column 12, lines 9-15, states, "As the observer eyes move to the lateral centers of the adjacent pixels or pixel columns, the observer passes over a respective one of the detector elements 40 whose output triggers **switching of the image data supplied in the other unobserved column of pixels** aligned with the associated parallax element of the parallax optic 3." Therefore, each module (3) can be read as the smallest addressable element in the electronic display which produces a complete 3D pixel of the three dimensional image as claimed.

Conclusion

12. This is a continuation of applicant's earlier Application No. 09/457,013. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2872


the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on (703) 308-1687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava *ava*
September 23, 2002


Cassandra Spyrou
Supervisory Patent Examiner
Technology Center 2800